

*What is claimed is:*

1. A method for manufacturing a substrate, comprising:

depositing a first photo-resist coating material on a supporting substrate;

5 exposing the first photo-resist coating material using a mask;

developing the first photo-resist coating material to provide a first photo-resist coating layer;

treating with a first treatment the first photo-resist coating layer to adjust a surface energy of the first photo-resist coating layer;

10 depositing a second photo-resist coating material on at least a portion of the first photo-resist coating layer;

exposing the second photo-resist coating material;

developing the second photo-resist coating material to provide a second photo-resist coating layer, wherein at least a portion of the second photo-resist coating layer overlaps at least  
15 a portion of the first photo-resist coating layer;

treating with a second treatment at least one portion of the first photo-resist coating layer;  
and

removing the second photo-resist coating layer.

20 2. The method of claim 1, wherein:

the step of treating with a first treatment comprises treating the first photo-resist coating

layer with at least one of an UV-ozone treatment or an oxygen-plasma treatment to provide a high surface energy; and

the step of treating with a second treatment comprises treating at least one portion of the first photo-resist coating layer to reduce a surface energy of the at least one surface.

5

3. The method of claim 2, wherein the step of treating with a second treatment comprises treating the at least one portion with a plasma treatment including a fluorine-containing gas mixture.

10

4. The method of claim 3, wherein the fluorine-containing gas mixture is at least one of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ ,

5. The method of claim 1, wherein the first photo-resist coating material is at least one of a Novolak based photo-resist, acrylic lacquer, epoxy lacquer and polyimide lacquer.

15

6. The method of claim 1, wherein the second photo-resist coating material is at least one of a Novolak based photo-resist, acrylic lacquer, epoxy lacquer and polyimide lacquer.

20

7. The method of claim 2, wherein the step of treating with a second treatment at least one portion of the first photo-resist coating layer comprises treating at least one portion using a plasma treatment including a gas mixture of tetrafluoromethane and oxygen in the

volume ratio 4:1 to reduce a surface energy of the at least one portion.

8. The method of claim 1, wherein the step of removing of the second photo-resist coating layer comprises removing the second photo-resist coating layer using at least one of acetone and tetrahydrofuran acetone.

9. A substrate having a non-continuous photo-resist coating layer, an insulating layer and a pixel defining layer formed on at least one surface of a supporting substrate, wherein the non-continuous photo-resist coating layer, insulating layer and pixel defining layer comprises a plurality of continuous portions, and the plurality of continuous portions comprise:

at least one high surface energy area; and

at least one low surface energy area, wherein at least one of a second photo-resist coating layer and a mask is used to at least temporarily overlap the continuous portion corresponding to the at least one high surface energy area in order to form the at least one low surface energy area..

10. The substrate of claim 9, wherein the high surface energy areas have a surface energy of about 60 – 70 dyne/cm and the low surface energy areas have a surface energy of about 20 – 35 dyne/cm.

11. The substrate of claim 9, wherein the supporting substrate is rigid.

12. The substrate of claim 9, wherein the supporting substrate is flexible.

5 13. The substrate of claim 9, wherein the supporting substrate is made of at least one of glass, plastic and silicon.

14. The substrate of claim 9, wherein the non-continuous photo-resist coating material is at least one of a Novolak based photo-resist, acrylic lacquer, epoxy lacquer and  
10 polyimide lacquer.

15 15. A method for manufacturing an organic electroluminescence device, comprising:  
depositing a first photo-resist coating material on a supporting substrate;  
exposing and developing the first photo-resist coating material to provide a first  
photo-resist coating layer;

treating with a first treatment at least one surface of the first photo-resist coating layer to  
adjust a surface energy of the first photo-resist coating layer;

depositing a second photo-resist coating material on at least a portion of the first  
photo-resist coating layer;

20 exposing and developing the second photo-resist coating material to provide a second  
photo-resist coating layer, wherein at least a portion of the second photo-resist coating layer

overlaps at least a portion of the first photo-resist coating layer;

treating with a second treatment at least one portion of the first photo-resist coating layer  
not overlapped by the second photo-resist layer;

removing the second photo-resist coating layer; and

5 supplying an ink drop containing an organic layer forming material to the resultant  
structure to form an organic layer.

16. The method of claim 15, wherein the organic layer forming material is at least one  
of a conductive polymer and a light-emitting polymer.

10

17. The method of claim 16, wherein the conductive polymer is at least one of  
polyethylene dioxothiophene – polystyrene sulfone acid , polyaniline and a mixture thereof.

18. The method of claim 16, wherein a surface tension of the conductive polymer is  
15 reduced by means of at least one of a surfactant and a lower alcohol.

19. The method of claim 18, wherein the lower alcohol is at least one of butanol and  
propanol.

20. The method of claim 16, wherein the light-emitting polymer is at least one of  
20 polyphenylenvinylenes and polyfluorenes.

21. The method of claim 15, wherein the organic layer is a light-emitting portion of the electroluminescence device.

5 22. The method of claim 15, wherein:

the step of treating with a first treatment comprises:

treating the first photo-resist coating layer with at least one of an UV-ozone treatment or an oxygen-plasma treatment to provide a high surface energy, and

the step of treating with a second treatment comprises:

10 treating at least one portion of the first photo-resist coating layer to reduce a surface energy of the at least one portion.

23. The method of claim 15, wherein the step of treating with a second treatment comprises treating the at least one portion with a plasma treatment including a  
15 fluorine-containing gas mixture.

24. The method of claim 23, wherein the fluorine-containing gas mixture is at least one of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ ,

20 25. The method of claim 15, wherein the first photo-resist coating material is at least one of a Novolak based photo-resist, acrylic lacquer, epoxy lacquer and polyimide lacquer.

26. The method of claim 15, wherein the second photo-resist coating material is at least one of a Novolak based photo-resist, acrylic lacquer, epoxy lacquer and polyimide lacquer.

5 27. The method of claim 15, wherein the step of treating with a second treatment at least one portion of the first photo-resist coating layer comprises treating the at least one portion using a plasma treatment including a gas mixture of tetrafluoromethane and oxygen in the volume ratio 4:1 to reduce a surface energy of the at least one portion.

10 28. The method of claim 15, wherein the step of removing the second photo-resist coating layer comprises removing the second photo-resist coating layer using at least one of acetone and tetrahydrofuran.

15 29. The method of claim 15, wherein the organic layer is formed by at least one of imprinting a conductive polymer and imprinting a solution of a light-emitting polymer using inkjet printing.

30. An organic electroluminescence device manufactured by the method according to claim 15.

20 31. An organic electroluminescence device, comprising:

a pixel define layer (PDL), wherein the PDL defines at least one area of the organic electroluminescence device with a high surface energy and at least one area of the organic electroluminescence device with a low surface energy.

5            32.    The organic electroluminescence device according to claim 31, wherein a surface energy of an area of the organic electroluminescence device where the PDL is not formed is either high or low.

10           33.    The organic electroluminescence device according to claim 31, wherein at least one layer is provided on the PDL, and a surface of the layer includes at least one area with a high surface energy and at least one area with a low surface energy.

RULE 1.126 > 34.  
~~33.~~    The organic electroluminescence device according to claim 31, wherein the PDL is a photo-resist coating layer.

15

35.  
~~34.~~    A method for manufacturing a substrate, comprising:  
  
             depositing at least one of a first insulating layer and a first pixel defining layer on a supporting substrate; and  
  
             treating at least a first portion of at least one of the first insulating layer and the first pixel  
20    defining layer; and



treating a second portion of the first portion of at least one of the first insulating layer and the first pixel defining layer.

36.

~~35.~~ The method of claim 34, wherein a third portion of at least one of the first

5 insulating layer and the first pixel defining layer is treated with the first treatment and the second treatment.

37.

~~36.~~ The method of claim 34, further comprising depositing at least one of a second insulating layer and a second pixel defining layer on at least a portion of at least one of the first

10 insulating layer and the first pixel defining layer.

38.

~~37.~~ The method of claim 34, wherein:

the step of treating at least a first portion, comprises treating with at least one of an UV-ozone treatment or an oxygen-plasma treatment to provide a high surface energy; and

15 the step of treating a second portion, comprises treating with a fluorine gas mixture.

39.

~~38.~~ The method of claim 34, wherein:

the step of treating at least a first portion, comprises treating with a fluorine gas mixture;  
and

the step of treating a second portion, comprises treating with at least one of an UV-ozone treatment or an oxygen-plasma treatment to provide a high surface energy.